method which ought to have been generally adopted, of arranging the instruments with each kind by the different makers in one case, instead of a complete line by each maker in a case by itself. An ingenious modification of Foucault's pendulum was seen at the Paris Observatory. It was only one meter long, but it showed the fact of the rotation of the earth after the lapse of fifteen seconds.

Professor Hallock described a peculiar lightning discharge he had observed at Lake Champlain. The flash came unexpectedly from a cloud about two miles from where the main shower was falling. It struck on a mass of rock, and on examining this it was found that instead of there being one or a few places where the lightning had struck, it was covered with innumerable little spots, each one indicating where a part of the flash had struck.

WILLIAM S. DAY,
Secretary.

NOTES ON PHYSICS.

THE GALTON WHISTLE.

IN the *Annalen der Physik* for July, 1900, Edelmann describes an improved form of the Galton whistle for use in studying the limits of audibility of high pitch sounds. This improved form of whistle is similar to the locomotive whistle in design, the vibrating air column being from 2 to 4 millimeters in diameter and from 0.7 to 5 or more millimeters in length. With a whistle 2 mm. in diameter Edelmann has produced sound waves, using the word sound in its physical sense, of 2 mm. wave-length, corresponding to a vibration frequency of 170,000 double vibrations per second. This is nearly an octave higher than the highest pitch obtained by König in 1899.

Edelmann determined the pitch by measuring the wave-length of the sound as indicated by Kundt's dust figures, in an elongated glass tube resonator. This resonator for the very high pitch waves was less than a millimeter in diameter of bore and about ten millimeters in length.

The present writer remembers well a very striking lecture experiment by Professor Kundt in 1890, in which the pitch limit of audibility was demonstrated by a Galton whistle, the actual existence of the physical sound, when the whistle was adjusted to give more than about 40,000 vibrations per second, was beautifully shown to a large audience by the effect of the whistle upon a sensitive gas flame.

THE GENESIS OF THE IONS IN THE DISCHARGE OF ELECTRICITY THROUGH GASES.

THE phenomena of the electric discharge through gases seemed only a few years ago to be so complicated that physicists almost despaired of finding an hypothesis which might bring order out of the mass of experimental results which had accumulated.

The discovery of the Röntgen rays stimulated research in this field greatly, and the observation that these rays in passing through a gas cause it to become an electrical conductor soon gave fixedness to the idea that a gas conducts electricity by having its molecules broken up into positively and negatively charged parts or ions which wander about through the gas.

This ionic hypothesis has already been of great value in suggesting lines of research; and the rapidly accumulating results of these recent researches, interpreted, of course, through the ionic hypothesis itself, show, under the widest variety of conditions, a degree of consistency which is rapidly giving to the ionic hypothesis the dignity of an established theory.

Some of the most striking applications of the ionic hypothesis have been noted in SCIENCE during the past three years.

PROFESSOR J. J. THOMSON, in the *Philosophical Magazine* for September, points out in a paper entitled 'The genesis of the ions in the discharge of electricity, through gases,' why the dielectric strength of a gas is approximately proportional to the pressure of the gas; why the dielectric strength of a thin layer of gas is greater than the dielectric strength (volts per centimeter) of a thick layer of the same gas; and he explains the striations of the positive column or glow in a Geissler tube.

The reader should keep in mind that the scientific explanation of a thing is a description of the thing in the simplest possible terms. Many scientists feel an objection to the use of the word *explanation* in that its use tends to confirm a hearer in the acceptance of the figments of his

imagination not simply as a model of the world (for this is to some extent a practical necessity), but as the world itself. As Münsterberg puts it: The greatest danger of the present day in education is the confusion of boundaries between our logical constructions and the teleological realms. W. S. F.

SCIENTIFIC NOTES AND NEWS.

THE National Academy of Sciences will hold its autumn meeting at Brown University on November 13th, 14th and 15th.

THE American Society of Naturalists will meet at Baltimore on December 27th and 28th, and with it the affiliated societies devoted to natural history. Christmas day comes this year on Tuesday, and the balance of the week scarcely gives a suitable time for the meetings of those societies whose sessions last longer than two days.

IT is reported that Sir John Murray, who is now engaged in an expedition to Christmas Island, will later join Professor Haeckel in Java. It will be remembered that the latter is searching for remains of *Pithecanthropus erectus*.

THE Senate of New York University has received and confirmed the votes of its judges selecting thirty eminent native-born Americans whose names are to be inscribed in the 'Hall of Fame.' The Americans selected as the most eminent are distributed as follows: Rulers and statesmen, 7; authors, 4; inventors, 4; preachers and theologians, 3; judges and lawyers, 3; soldiers and sailors, 3; men of science, 2; philanthropists, 2; educators, 1; painters, 1. The inventors on this list are Fulton, Morse, Whitney and Howe, and the men of science Audubon and Gray. Franklin is of course also included. Ninety-seven judges voted and the votes cast for men of science were as follows: John James Audubon, 67; Asa Gray, 51; Joseph Henry, 44; Matthew Fontaine Maury, 20; Benjamin Thompson, 19; Benjamin Silliman, 16; Benjamin Peirce, 14; Nathaniel Bowditch, 10; Alexander B. Bache, 9; Spencer Baird, 8; Henry Draper, 8; Maria Mitchell, 7; David Rittenhouse, 6. Twenty further names are to be selected in 1902 by the same judges who may vote for those who received at least 10 votes in the present competition.

THE death is announced of Dr. R. J. Kupper, formerly professor of geometry in the German Technical Institute of Prague.

THE *Bulletin* of the American Mathematical Society states that the Steiner prizes of 6,000 Marks, which were not awarded, owing to no papers being presented, have been divided into three parts which have been given to Dr. Karl Friedrich Geiser, professor at the polytechnic school at Zurich, for his individual researches in geometry and his services in the publication of Steiner's lectures; to David Hilbert, professor in the University of Göttingen, for his important researches on the axioms of geometry and for the advancement which analytic geometry has experienced from his work on the theory of invariants, and to Dr. Ferdinand Lindemann, professor at the University of Munich who has earned special distinction in geometry by his celebrated discussion of the quadrature of the circle, as well as by editing Clebsch's 'Vorlesungen über Geometrie.'

THE Hufeland Society, of Berlin, offers two prizes of 800 Marks for researches on the following subjects: (1) On the influence of salts in drinking water on the constitution of the blood and (2) The influence of thermal and mechanical stimuli on the circulation of the blood. The papers, which may be written in English, must be sent to Professor O. Liebreich, Neustadtische Kirsch Strasse 9, Berlin, prior to March 1, 1901.

A CIVIL service examination will be held on November 20th for the position of assistant in serum therapeutics, Biochemic Division, Bureau of Animal Industry, Department of Agriculture. The salary of the position is $720 per annum, and the examination will be chiefly on serum therapeutics and elementary general chemistry.

NO news has been received from the *Windward* later than August 10th, at which date, however, it had safely arrived at Godhaven, half way to Cape York.

IT is reported that Mr. Ziegler of New York will defray the expenses of an expedition to the North Polar regions under the direction of Mr. E. P. Baldwin who accompanied Lieutenant Peary as meteorologist in 1893–94. The plan